



ELaNa VII CubeSat Launch on ORS-4 Mission

November 2015

OVERVIEW

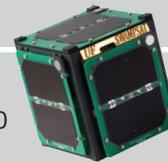
NASA will launch two small research satellites, or CubeSats, selected through the CubeSat Launch Initiative (CSLI) for two universities as part of the seventh installment of the Educational Launch of Nanosatellite (ELaNa) missions. More than 100 students have been involved in the design, development and construction of the CubeSats that will be flown as auxiliary payloads on the U.S. Air Force-led Operationally Responsive Space-4 (ORS-4) launch of its Super Stryi vehicle. Launch is planned for no earlier than Nov. 2, 2015 from the Pacific Missile Range Facility, Kauai.

CubeSats are playing an increasingly larger role in exploration, technology demonstrations, scientific research and educational investigations at NASA. These miniature satellites provide a low-cost platform for NASA missions, including planetary space exploration; Earth observation; fundamental Earth and space science; and technology demonstrations such as cutting-edge laser communications, energy storage, in-space propulsion and autonomous movement capabilities. They also allow educators an inexpensive means to engage students in all phases of satellite development, operation and exploitation through real-world, hands-on research and development experience on NASA-funded rideshare launch opportunities.

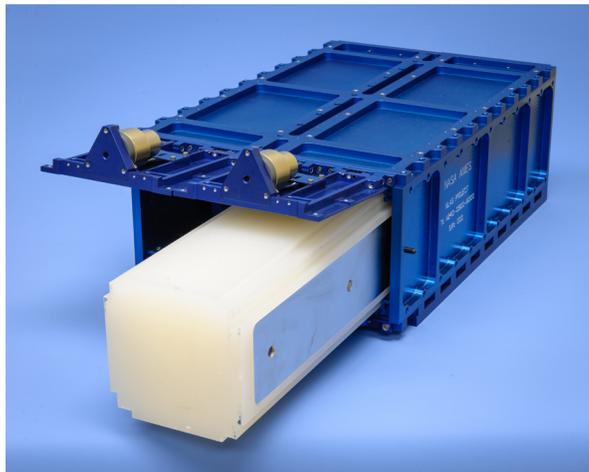
The CubeSat Launch Initiative enables the launch of CubeSat projects designed, built and operated by students, teachers and faculty. CSLI provides access to space for CubeSats developed by the NASA centers and programs, educational institutions and non-profit organizations giving all these CubeSat developers access to a low-cost pathway to conduct research in the areas of science, exploration, technology development, education or operations. ELaNa Missions, managed by the Launch Services Program at Kennedy Space Center, provide a rideshare launch for the CubeSats selected through CSLI. ELaNa mission managers and their teams reach students at schools and colleges across the United States, providing spaceflight education through the preparation of payloads – licensing, integration and testing – that are flown in space. Since its inception in 2010, the initiative has selected more than 100 CubeSats and launched 41 CubeSat missions from primarily educational and government institutions around the United States. These miniature satellites were chosen from a prioritized queue established through a shortlisting process from proposers that responded to public announcements on NASA's CubeSat Launch Initiative. NASA will announce another call for proposals in mid-August 2016.

Basic CubeSat Facts:

- Built to standard dimensions of 1 unit (1U) which is equal to 10x10x10 cm
- Can be 1U, 2U, 3U or 6U in size
- Weigh less than 1^{1/3} kg (3 lbs) per U – 6U may be up to 12-14 kg
- Deployed from a NASA Nanosatellite Launch Adapter System Mark (NLAS Mk.) I Dispenser



CUBESAT DEPLOYMENT



The NLAS Mk. I dispenser was designed and manufactured at NASA's Ames Research Center to integrate CubeSats onto launch vehicles. Credit: NASA

Two CubeSat projects were selected for the ELaNa VII mission. The CubeSats will occupy one side of a NLAS Mk. I dispenser on the first flight of the Super Stryi rocket that will ferry them to space. The NLAS Mk. I was designed and manufactured by Ames Research Center to integrate CubeSats onto launch vehicles. After the main payload deploys, the CubeSats will separate from their NLAS about 12 minutes into flight. After 45 minutes in orbit, the CubeSat transmitters will turn on and university ground stations will listen for their beacons, determine their small satellites' functionality and announce operational status. CubeSat mission durations and orbital life vary, but are anticipated to last at least 90 days. Upon mission completion, the CubeSats fall to Earth, burning up in the atmosphere.

NASAfacts

SAFETY AND MISSION ASSURANCE

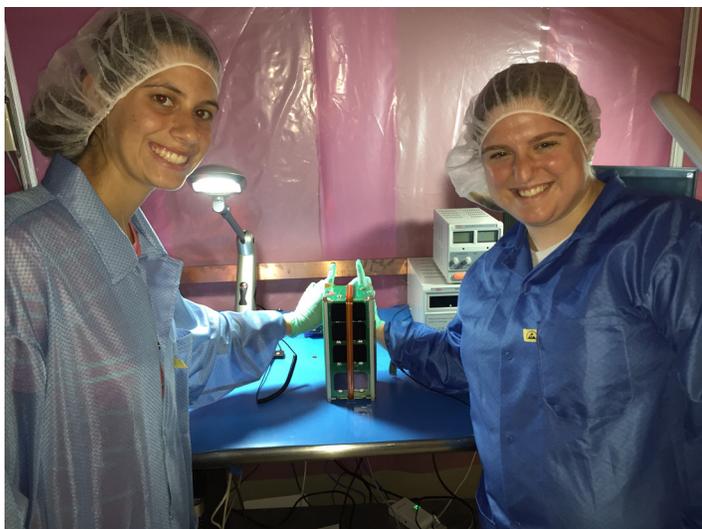
Each CubeSat developer verified that its satellite complied with the ORS Interface Control Document and NLAS Mk. I requirements. NASA jointly conducted a mission readiness review with each CubeSat developer. Each ELaNa CubeSat complies with U.S. and NASA orbital debris mitigation standard practices.

Argus

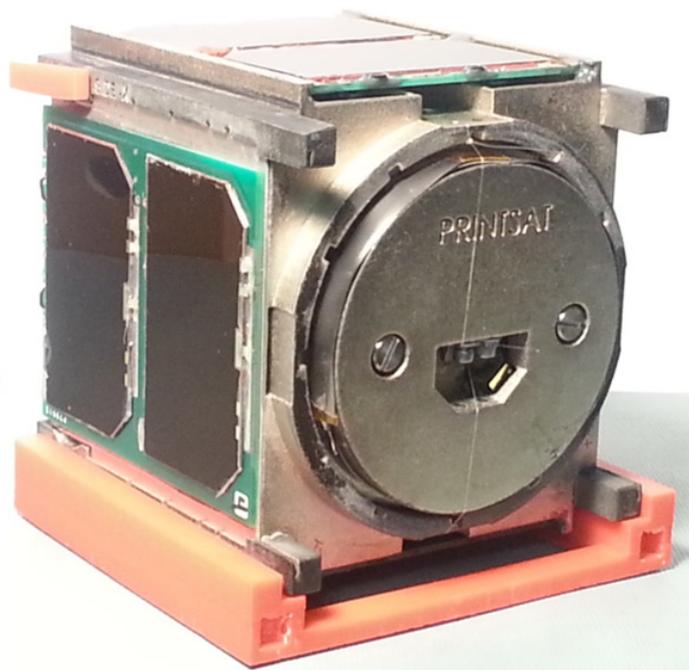
St. Louis University – St. Louis, Mo.

Vanderbilt University – Nashville, Tenn.

The Argus mission will improve the predictions of how well modern electronics will operate in space by flying a set of devices and comparing their radiation event rates against ground predictions. Scientists at Vanderbilt will use this data to improve their models of the effects of radiation on space electronics. Argus leverages commercial-off-the-shelf CubeSat systems and extremely simple payload requirements to enable a short-turnaround mission.



*Two students from St. Louis University completing pre-integration checkout of Argus.
Credit: St. Louis University*



Montana State University's PrintSat. Credit: Montana State University

PrintSat

Montana State University – Bozeman, Mont.

The PrintSat mission is a technology demonstration mission and student training and workforce development project that will measure the effectiveness of additive manufacturing and the Windform XT 2.0 material as a structural material for space structures. It will demonstrate the use of additive manufacturing for primary and secondary structural elements and deployable mechanisms for the spacecraft. Measurements will be acquired from several on-board sensors to quantify changes in the material properties throughout the mission lifetime and measure penetrating ionizing radiation.

To contact the ELaNa VII Launch Public Affairs Office, call 202-358-1100

For additional information about the ELaNa VII CubeSats, visit:

Argus: sites.google.com/a/slu.edu/ssrl/slu-02-argus

PrintSat: ssel.montana.edu/printsat.html

National Aeronautics and Space Administration

Headquarters

300 E Street, SW
Washington, DC 20546
www.nasa.gov/centers/hq

www.nasa.gov

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